

Cleansing the Body of Candida's Dangerous Toxins

Like all living things, the yeast *Candida albicans* releases waste into its environment as it consumes food and multiplies.

Systemic Candida overgrowth can release two dangerous toxins into the body.

An accumulation of two toxins — acetaldehyde and gliotoxin — is especially common in those with systemic Candida overgrowth.

SYSTEMIC CANDIDA OVERGROWTH AND LEAKY GUT

Candida is a yeast that naturally grows in parts of the body. More than 70 percent of healthy people naturally have the fungus *Candida albicans* living inside their body. The single-celled organism Candida reproduces asexually and feeds on byproducts found within the body, like dead tissue and sugar from the diet.

Healthy people have Candida living in their gastrointestinal tract, in their mouth, and in their birth canal.¹

When your inner ecosystem is in balance, a large number of good bacteria and yeast are thriving, competing with Candida and other opportunistic microbes for food and space to grow, the mucosa of the gut wall is sealed and healthy and Candida overgrowth is kept in check.

When your inner ecosystem is out of balance, Candida has an opportunity to rapidly grow and take over its environment, can shoot "runners" or threads of Candida through tissue making it especially invasive,^{2,3} make the gut leaky.⁴

A sealed gut lining protects the body from outside chemicals, bacteria, parasites, and food irritants. When leaky, it no longer protects the body and creates extra work for the liver and your immune system.

Spreading beyond the gut it can now be a *cause* of leaky gut, becoming pathogenic by growing tentacles that burrow into the mucosa lining of the gut to cause chronic inflammation. Coupled with unchecked inflammation it makes a healthy gut leaky and permeable and has the chance to proliferate and create systemic infection.

Signs of systemic overgrowth range from **digestive troubles to migraines, skin disorders like acne and eczema, stiff joints, and brain fog**, often misdiagnosed, ignored, or easily confused for other health disorders. Candida yeast may be the direct cause of a major health problem or one possible cause contributing to poor health, as Dr. William Crook pointed out in *The Yeast Connection and Women's Health*.⁵

2 CANDIDA TOXINS THAT CAN POISON YOUR BODY

Part of what makes systemic Candida overgrowth so noxious is the toxins that it naturally produces during its life cycle — and dumps into your body!

1. Acetaldehyde: One pollutant Candida produces is acetaldehyde.^{6,7,8} In Candida, acetaldehyde is a metabolic byproduct — similar to the carbon dioxide that you exhale after inhaling oxygen. Too much acetaldehyde is the equivalent of alcohol poisoning; an accumulation of acetaldehyde is associated with Fetal Alcohol Syndrome.^{9,10} Acetaldehyde is associated with Alzheimer's disease.¹¹ Gluten-free quinoa, buckwheat, amaranth, and millet are supporters of immune health, best enjoyed by following the 80/20 rule — fill up no more than 20 percent of your plate with these nourishing grain-like seeds.

Studies show that a build-up of acetaldehyde can lead to oxidative stress.^{12,13,14}

It damages DNA in the cells. It has also been found to increase the risk of alcohol-related cancers.^{15,16}

2. Gliotoxin: Candida and other species of fungus make a poison called gliotoxin. Gliotoxin stimulates the death of cells and the destruction of tissue. In fact, we are still learning about the devastating effects of gliotoxin. Gliotoxin stimulates the destruction of cells in the liver — your number one detox organ.¹⁷ Gliotoxin also suppresses the immune system and kills cells that belong to the immune system.¹⁸ Remember, both your liver and your immune system play a pivotal role in the protection and detoxification of the body.

Another study published in April 2013 even found that gliotoxin is especially high in patients with MS (multiple sclerosis), an autoimmune disease that affects aspects of the central nervous system, like the brain.¹⁹

As Candida grows stronger and proliferates, it becomes more poisonous than ever. Studies have found that once a yeast forms biofilm — or a protective matrix around itself — the biofilm increases the production of gliotoxin.²⁰

Gliotoxin protects Candida as it grows.

A 2010 article published in *Thrombosis and Haemostasis* shows that gliotoxin prevents platelets from sticking together, making Candida especially virulent.²¹ Platelets are found in the blood, and they help the body to form blood clots — which is especially useful after an injury. Platelets also contain high amounts of a fungicidal protein, which has been shown to kill Candida.²²

THE CANDIDA CLEANSE: SUPPORT YOUR DETOX PATHWAYS

Fermented veggies and probiotic liquids inoculate the gut with beneficial bacteria. Beneficial bacteria soothe inflammation (or leakiness) and compete with Candida for nutrients. Research published in 2012 shows that **lactic acid — produced by good bacteria — inhibits the growth of Candida.**²³

In a 2015 study published in *Nature Communications*, researchers observed that placing even a small amount of sugar on fungal Candida cells could trigger the death of healthy immune cells needed to fight off Candida.²⁴

Cruciferous vegetables, such as cabbage, cauliflower, and broccoli, help the body to make *glutathione*.^{25,26} Because the liver relies on a steady supply of glutathione, it also plays a critical role in the detoxification process. When levels of glutathione are low, detoxification slows down, and the liver becomes congested and toxic.

According to research, glutathione can help to detoxify acetaldehyde from tissues.²⁷

Glutathione is your most powerful antioxidant.

REFERENCES:

1. Calderone RA. *Candida and Candidiasis*. 2002. ASM Press, Washington DC.
2. Mavor AL, et al. 2005. Systemic fungal infections caused by *Candida* species: epidemiology, infection process and virulence attributes. *Curr. Drug Targets* 6(8): 863–874.
3. Vytkova S, et al. 2011. The fungal pathogen *Candida albicans* autoinduces hyphal morphogenesis by raising extracellular pH. *mBio* 2(3):e00055-11. doi:10.1128/mBio.00055-11.
4. Klotz SA, et al. 2010. The Perfect Adhesive. *Environmental Microbiology, Geomicrobiology, Soil Microbiology, Biocontrol* 1, 838–844.
5. Crook, William G. *The Yeast Connection and Women's Health*. Square One Publishers; Reprint edition (March 15, 2007). Print.
6. J Tillonen, et al. Role of Yeasts in the Salivary Acetaldehyde Production From Ethanol Among Risk Groups for Ethanol-Associated Oral Cavity Cancer. *Alcoholism: Clinical and Experimental Research*. 1999; 23: 1409–1411.
7. PK Mukherjee, et al. Alcohol dehydrogenase restricts the ability of the pathogen *Candida albicans* to form a biofilm on catheter surfaces through an ethanol-based mechanism. *Infect Immun*. 2006 Jul;74(7):3804-16.
8. M Mohd Bakri. The expression of *Candida albicans* acetaldehyde producing enzymes in *C. albicans* infected mucosal lesions: a potential role in some oral cancers. *Univ of Otago*. 2011.
9. ML Hard, et al. The role of acetaldehyde in pregnancy outcome after prenatal alcohol exposure. *Ther Drug Monit*. 2001 Aug;23(4):427-34
10. NL Day, et al. Prenatal alcohol exposure: a continuum of effects. *Semin Perinatol*. 1991 Aug;15(4):271-9.
11. S Ohta, et al. Mitochondrial ALDH2 deficiency as an oxidative stress. *Ann N Y Acad Sci*. 2004 Apr;1011:36-44.
12. M Tong, et al. Acetaldehyde-Mediated Neurotoxicity: Relevance to Fetal Alcohol Spectrum Disorders. *Oxidative Medicine and Cellular Longevity*. 2011; 2011: 13.
13. PS Brocardo, et al. The role of oxidative stress in fetal alcohol spectrum disorders. *Brain Res Rev*. 2011 Jun 24;67(1-2):209-25. Epub 2011 Apr 3.
14. H Joenje. *Metabolism: Alcohol, DNA and disease*. 07 July 2011; 475, 45–46. Epub 2011 July 06.
15. International Agency for Research on Cancer Monograph Working Group, Special Report: Policy A review of human carcinogens—Part E: tobacco, areca nut, alcohol, coal smoke, and salted fish. *The Lancet* 2009 10, 1033–1034.
16. K Nakamura, et al. Acetaldehyde adducts in the brain of alcoholics. *Archives of Toxicology*. 2003; 77 (10): 591–3.
17. Wright, M. C., Issa, R., Smart, D. E., Trim, N., Murray, G. I., Primrose, J. N., ... & Mann, D. A. Gliotoxin stimulates the apoptosis of human and rat hepatic stellate cells and enhances the resolution of liver fibrosis in rats. *Gastroenterology*. 2001; 121(3), 685–698.
18. Sutton, P., Newcombe, N. R., Waring, P., & Müllbacher, A. In vivo immunosuppressive activity of gliotoxin, a metabolite produced by human pathogenic fungi. *Infection and immunity*, 1994; 62(4), 1192–1198.
19. de Arruda, M. S. P. Effect of *C. albicans* infection on experimental autoimmune encephalitis. 2013.
20. Bruns, S., Seidler, M., Albrecht, D., Salvermoser, S., Remme, N., Hertweck, C., Brakhage, A. A., Kniemeyer, O. and Müller, F.-M. C. Functional genomic profiling of *Aspergillus fumigatus* biofilm reveals enhanced production of the mycotoxin gliotoxin. *Proteomics*, 2010; 10: 3097–3107.
21. Bertling, A., Niemann, S., Uekötter, A., Fegeler, W., Lass-Flöri, C., von Eiff, C., & Kehrel, B. E. *Candida albicans* and its metabolite gliotoxin inhibit platelet function via interaction with thiols. *Thrombosis & Haemostasis*, 2010; 104(2), 270.
22. Yeaman MR, Ibrahim AS, Edwards JE, et al. Thrombin-induced rabbit platelet microbicidal protein is fungicidal in vitro. *Antimicrob Agents Chemother* 1993; 37: 546–553.

23. DR Tucker, et al. Protection of Vaginal Epithelial Cells with Probiotic Lactobacilli and the Effect of Estrogen against Infection by *Candida albicans*. *Open Journal of Medical Microbiology*. 2012; 2(3), 54-64.
24. Teresa R. O'Meara, Amanda O. Veri, Troy Ketele, Bo Jiang, Terry Roemer, Leah E. Cowen. Global analysis of fungal morphology exposes mechanisms of host cell escape. *Nature Communications*, 2015; 6: 6741 DOI: 10.1038/ncomms7741
25. Li Wang, et al. Dietary intake of Cruciferous vegetables, Glutathione S-transferase (GST) polymorphisms and lung cancer risk in a Caucasian population. *Cancer Causes Control*. 2004 Dec;15(10):977-85.
26. TK Lam, et al. Cruciferous vegetable consumption and lung cancer risk: a systematic review. *Cancer Epidemiol Biomarkers Prev*. 2009 Jan;18(1):184-95.
27. H Anni, et al. Binding of acetaldehyde to a glutathione metabolite: mass spectrometric characterization of an acetaldehyde-cysteinyglycine conjugate. *Alcohol Clin Exp Res*. 2003 Oct;27(10):1613-21.